

PATENT CLAIMS

1. Apparatus for determining and/or monitoring a physical or chemical, process parameter of a medium, comprising: a sensor; a first control/evaluation unit; and a second control/evaluation unit; wherein each control/evaluation unit has multiple components, characterized in that at least one component of the first and second control/evaluation units (10, 11) is embodied redundantly and diversely.

2. Apparatus as claimed in claim 1, characterized in that a first microprocessor (15) is assigned to the first control/evaluation unit (10), a second microprocessor (16) is assigned to the second control/evaluation unit (11), and the two microprocessors (15, 16) are of different types.

3. Apparatus as claimed in claim 1 or 2, characterized in that a first microprocessor (15) is assigned to the first control/evaluation unit (10), a second microprocessor (16) is assigned to the second control/evaluation unit (11), and the two microprocessors (15, 16) come from different sources.

4. Apparatus as claimed in claim 1, 2 or 3, characterized in that software (19, 20) stored in the microprocessors (15, 16) comes from different manufacturers.

5. Apparatus as claimed in claim 1, characterized in that the process parameter is fill level, foam formation, flow rate, density, viscosity, pressure, conductivity, or chemical composition of the medium.

6. Apparatus as claimed in one or more of the preceding claims, characterized in that the sensor is a sensor (1) for determining and/or monitoring the fill level of a medium in a container, or for determining the density of a medium in the container.

7. Apparatus as claimed in claim 6, characterized in that the sensor comprises an oscillatable unit (2), and a sending/receiving unit (6), wherein the oscillatable unit (2) is mounted at the height of the predetermined fill level, or, wherein the oscillatable unit (2) is mounted such that it is immersed in the medium to a defined depth, and wherein the sending/receiving unit (6) excites the oscillatable unit (2) to oscillate at a predetermined excitation frequency, and receives the response oscillations of the oscillatable unit (2).

8. Apparatus as claimed in claim 1 and 7, characterized in that the two control/evaluation units (10, 11) detect the reaching of the predetermined fill level as soon as a predetermined change in frequency occurs, or, the two control/evaluation units (10, 11) determine the density of the medium on the basis of the oscillation frequency of the oscillatable unit (2).

9. Apparatus as claimed in claim 7, characterized in that the sending/receiving unit (6) is a disc-shaped piezoelectric element, on whose side facing away from the oscillatable unit an electrode structure is provided, which has at least a sending/receiving electrode, a receiving/sending electrode, and a ground electrode.

10. Apparatus as claimed in claim 9, characterized in that the sending/receiving electrode and the receiving/sending electrode are semi-circular,

the ground electrode is bar-shaped,
and the sending/receiving electrode and the receiving/sending
electrode are arranged mirror-symmetrically with respect to the
bar-shaped, centrally-arranged, ground electrode.